REMARKS

Claims 49-76 and 124-208 are pending in the above-captioned patent application after this Response. Claims 49-76 and 124-208 have been rejected. The Applicant respectfully disagrees with and respectfully traverses the rejection of claims 49-76 and 124-208.

Reconsideration of the pending application is respectfully requested in view of the arguments set forth below. The Applicant respectfully requests that this Response be considered after final rejection because the Applicant believes that the Application is in proper form for allowance.

INTERVIEW SUMMARY

On September 7, 2004, the undersigned attorney for the applicant conducted a telephonic interview with the Examiner Bernard Souw and his Supervisor, John Lee. During the interview, Mr. Lee agreed that the Final Rejection was premature and would be withdrawn. However, no agreement was reached on the merits of the claims. More specifically, Mr. Lee stated that he would have to look at the references in more detail prior to reaching a final determination regarding patentability.

Rejections Under 35 U.S.C. § 103(a)

Claims 49-76, 124-144, 161, 177 and 193

Claims 49-76, 124-144, 161, 177 and 193 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Nakasuji (USPAT # 5,892,224) in view of Sogard et al. (USPAT # 6,014,200), Kobinata (USPAT # 6,462,346) and Muraki et al. (USPAT # 5,929,454). The Applicant respectfully traverses the rejection of claims 49-76, 124-144, 161, 177 and 193 and respectfully submits that the rejection of claims 49-76, 124-144, 161, 177 and 193 is unsupported by the art and should be withdrawn.

More specifically, the Examiner asserts that Nakasuji describes a mask inspection system, comprising all of the elements as claimed in the present invention with the exception of first and second multi-aperture arrays having apertures with a first and second shape, respectively, and a beamlet blanking section disposed between the beamlet shaping section and the mask. The Examiner further contends that these additional elements are disclosed by Sogard et al. and/or Kobinata and Muraki et al.

Additionally, the Examiner cites Sogard et al. as disclosing and easily changing between particular shapes for the beamlets and the multi-aperture arrays, and as disclosing a deflector for filling-in spaces between adjacent shaped beamlets.

The Applicant provides that Nakasuji is directed to an apparatus and methods for detecting defects in a pattern defined by a mask, reticle, wafer, or other "sample." The defect detecting inspection system includes an electron source that directs an electron beam EB toward an aperture plate 71 defining multiple apertures 71a to create multiple parallel electron beams EB_n. The electron beams EB_n then pass through a first condenser lens 72 and a second condenser lens 73 and a deflector 74 before encountering a sample 75 to be tested. The sample 75 comprises multiple subfields 78 each having one image that will be scanned by one of the electron beams EB_n.

As provided in Nakasuji, the dimension of each beam as focused on the sample is a 0.1 μm by 0.1 μm square at a pitch of 100 μm. The defect detecting inspection system is adapted to scannably irradiate the multiple charged particle beams EB_n simultaneously on respective measurement points ("loci") in an irradiation region on the surface of the sample 75. After each region is scanned, the sample 75 moves in either the x-direction or the y-direction and is scanned again in like manner. Effectively, Nakasuji is utilizing the charged particle beams EB_n to scan or trace the perimeter of each of the desired areas. The inspection system further includes a detector assembly 81, 83, 84 that can be situated so as to detect charged particles passing through the irradiated region of the sample 75, or the detector assembly 81, 83, 84 can be situated so as to detect reflected electrons propagating from the loci in the irradiated region as a result of the electron beams EB_n impinging on the loci. (Nakasuji column 2, lines 1-24, column 10, lines 42-64, column 20, line 66 through column 22, line 7, and in Figures 1, 2(b) and 11).

Further, the Applicant provides that Sogard et al. is directed to, in relevant part, an electron beam lithography system 100 having a beamlet shaping section 108 including a first multi-aperture array 116 having apertures of a first shape, a second multi-aperture array 126 having apertures of a second shape, and deflectors 162 to fill in spaces between adjacent beamlets on the surface to be exposed. A source of electrons 102 is directed toward the first multi-aperture array 116 and then redirected

toward the second multi-aperture array 126, and the resulting electron beamlets 204 can be triangle shaped or rectangle shaped. The deflectors 162 can then be used to deflect the electron beamlets 204 to fill in the spaces between the adjacent shaped beamlets so as to make a complete pattern on the surface to be exposed. (Sogard et al. Abstract, column 6, lines 17-38, column 6, line 65 through column 8, line 3, column 9, line 31 through column 10, line 5, column 16, lines 49-63, and in Figures 1, 2 and 5A-5I).

Additionally, as provided by the Examiner, Kobinata is directed to a mask inspection apparatus 2 that includes in relevant part a blanking aperture 15 to help shape an electron beam from an electron gun 11. (Kobinata column 5, lines 15-31, and in Figures 2 and 3). Further, the Applicant provides that Muraki et al. is directed to an electron beam exposure apparatus and position detection apparatus including an electron gun 1 that generates electron beams that are shaped and focused in relevant part by a blanking aperture BA. (Muraki et al. column 6, line 59 through column 8, line 6, and in Figure 1).

However, there is no incentive provided in the cited references to combine the references of Nakasuji, Sogard et al., Kobinata, and Muraki et al., to achieve the elements and limitations as claimed in the present invention. Nakasuji is directed to an inspection system that uses a simple shape, typically a 0.1μm by 0.1μm square, for the beamlets because each beamlet is designed to scan or trace the perimeter of one of the desired areas. The additional references, Sogard et al. particularly, and also Kobinata and Muraki et al., each apply different features to help shape the electron beamlets. As Nakasuji is not designed to successively, stepwise, match adjacent desired areas arranged in a desired pattern as is the present invention, there is no incentive for altering the beamlets of Nakasuji with the shaping mechanisms of Sogard et al., Kobinata, and Muraki et al., to create different shapes for the spaced apart beamlets, or for giving the beamlets the same cross-sectional size or the same pattern as one of the desired areas. Therefore, the use of variable shaped beamlets, as are possible with Sogard et al., that have the same cross-sectional shape or pattern of one of the desired areas, will not make the inspection assembly of Nakasuji any more or less effective at tracing the perimeter of one of the desired areas. Accordingly, it would not have been

obvious to one of ordinary skill in the art to combine the references as provided by the Examiner because variable shapes are not necessary or even relevant to a defect detecting inspection system that merely traces the outline of a given area.

Additionally, there is no incentive provided in the cited references to combine Nakasuji with Sogard et al., Kobinata, and Muraki et al., to create an inspection system that creates electron beams that have a cross-sectional shape of at least either a triangle or a rectangle, or a first multi-aperture array having a first shape, wherein a first portion of the first shape is substantially hexagon shaped. Yet further, there is no incentive provided in the cited references to combine Nakasuji with Sogard et al., Kobinata, and Muraki et al., to create an inspection system including at least one deflector to deflect the beamlets to fill in the spaces between adjacent beamlets. Still further, there is no incentive provided in the cited references to combine Nakasuji with Sogard et al., Kobinata, and Muraki et al., to create an inspection system including a control system to control and adjust a first multi-aperture array and a second multi-aperture array so the shape of the electron beams can be easily changed between a first shape and a second shape that is different from the first shape.

In summary, as provided above, there is no incentive provided in the cited references to combine Nakasuji with Sogard et al., Kobinata, and Muraki et al., to create an inspection system with shaped beamlets to scan or trace the perimeter of one of the desired areas. The use of variable shaped beamlets as can be achieved to different degrees with Sogard et al. Kobinata, and Muraki et al., will simply not make the inspection assembly of Nakasuji any more or less effective at tracing the perimeter of one of the desired areas. In fact, it may only serve to make the inspection assembly of Nakasuji unnecessarily more complicated. Accordingly, it would not have been obvious to one of ordinary skill in the art to combine the references as provided by the Examiner to achieve the elements and limitations as claimed in the present invention.

In contrast to the cited references, claim 49 of the present application recites "(a)n inspection system ... comprising: a source of electrons; a stage supporting the mask; a beamlet shaping section disposed between the source of electrons and the mask, the beamlet shaping section including a first multi-aperture array having apertures with a first shape and a second multi-aperture array having apertures with a

second shape; a beamlet blanking section disposed between the beamlet shaping section and the mask; a first electron lens group directing electrons emitted from the source of electrons into a collimated beam in an axial direction towards the first multi-aperture array; a second electron lens group directing each beamlet in the array of electron beamlets formed by the first multi-aperture array towards the center of a corresponding aperture in the second multi-aperture array; an electron deflector disposed between the first multi-aperture array and the second multi-aperture array; and a detector assembly that measures electrons to inspect the mask."

Because the cited references do not teach or suggest all of the elements of claim 49, the § 103(a) rejection is unsupported by the art and should be withdrawn. Further, because claims 50-76 depend either directly or indirectly from claim 49, the rejection of claims 50-76 is also unsupported by the art and should be withdrawn.

Additionally, in contrast to the cited references, claim 124 of the present application recites "(a) method for inspecting a device with electrons ... comprising the steps of: generating electrons; directing the electrons in a collimated beam in an axial direction towards the device; directing the collimated beam of electrons through a beamlet shaping section comprising a first multi-aperture array having M rows and N columns of apertures having a first shape, a second multi-aperture array having M rows and N columns of apertures having a second shape; directing the electrons emerging from the beamlet shaping section through a beamlet blanking section; directing electron beamlets having the first shape formed by the first multi-aperture array towards the center of corresponding apertures in the second multi-aperture array; deflecting each of the electron beamlets formed by the first multi-aperture array away from the center of the corresponding aperture in the second multi-aperture array; and measuring electrons with a detector assembly to inspect the device."

Because the cited references do not teach or suggest all of the elements of claim 124, the § 103(a) rejection is unsupported by the art and should be withdrawn. Further, because claims 125-143 depend either directly or indirectly from claim 124, the rejection of claims 125-143 is also unsupported by the art and should be withdrawn.

Further, in contrast to the cited combination of references, claim 144 of the present application recites "(a)n inspection system ... comprising: a beamlet supply

assembly that directs a shaped beamlet toward one of the actual areas of the mask, the shaped beamlet having a cross-sectional size and shape that corresponds to a cross-sectional size and shape of one of the desired areas, wherein the beamlet supply assembly selectively and alternatively adjusts the shaped beamlet to have a cross-sectional shape of at least a triangle and a rectangle."

Because the cited references do not teach or suggest all of the elements of claim 144, the § 103(a) rejection is unsupported by the art and should be withdrawn.

Additionally, in contrast to the cited references, claim 161 of the present application recites "(a)n inspection system ... comprising: a beamlet supply assembly that directs a plurality of spaced apart beamlets toward the mask, the beamlet supply assembly including a first multi-aperture array having apertures with a first shape and a second multi-aperture array having apertures with a second shape that is different from the first shape, wherein a first section of the first shape is substantially hexagon shaped."

Because the cited references do not teach or suggest all of the elements of claim 161, the § 103(a) rejection is unsupported by the art and should be withdrawn.

Still further, in contrast to the cited references, claim 177 of the present application recites "(a)n inspection system ... comprising: a beamlet supply assembly that directs a plurality of spaced apart, shaped beamlets toward the mask, wherein the plurality of spaced apart, shaped beamlets are organized in a pattern that is substantially similar to at least a portion of one of the desired patterns; and at least one deflector to deflect the shaped beamlets to fill in the spaces between adjacent shaped beamlets to substantially complete one of the desired patterns."

Because the cited references do not teach or suggest all of the elements of claim 177, the § 103(a) rejection is unsupported by the art and should be withdrawn.

Yet further, in contrast to the cited combination of references, claim 193 of the present application recites "(a)n inspection system ... comprising: a beamlet supply assembly that directs a plurality of spaced apart beamlets toward the mask, the beamlet supply assembly including a first multi-aperture array and a second multi-aperture array; and a control section that adjusts the position of the first multi-aperture aperture array and the second multi-aperture array so that the shape of the beamlets can be easily

changed between a first shape and a second shape that is different from the first shape."

Because the cited references do not teach or suggest all of the elements of claim 193, the § 103(a) rejection is unsupported by the art and should be withdrawn.

Claims 145, 146, 155, 156, 167-170, 182-185 and 199-202

Claims 145, 146, 155, 156, 167-170, 182-185 and 199-202 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Nakasuji in view of Sogard, Kobinata and Muraki et al., and further in view of Yamada et al. (USPAT # 6,137,111). The Applicant respectfully traverses the rejection of claims 145, 146, 155, 156, 167-170, 182-185 and 199-202, and respectfully submits that the rejection of claims 145, 146, 155, 156, 167-170, 182-185 and 199-202 is unsupported by the art and should be withdrawn.

As provided above, the § 103(a) rejection of claim 144 is unsupported by the art and should be withdrawn. Because claims 145, 146, 155 and 156 depend either directly or indirectly upon claim 144, the rejection of claims 145, 146, 155 and 156 is also unsupported by the art and should be withdrawn.

Further, as provided above, the § 103(a) rejection of claim 161 is unsupported by the art and should be withdrawn. Because claims 167-170 depend either directly or indirectly upon claim 161, the rejection of claims 167-170 is also unsupported by the art and should be withdrawn.

Additionally, as provided above, the § 103(a) rejection of claim 177 is unsupported by the art and should be withdrawn. Because claims 182-185 depend either directly or indirectly upon claim 177, the rejection of claims 182-185 is also unsupported by the art and should be withdrawn.

Still further, as provided above, the § 103(a) rejection of claim 193 is unsupported by the art and should be withdrawn. Because claims 199-202 depend either directly or indirectly upon claim 193, the rejection of claims 199-202 is also unsupported by the art and should be withdrawn.

Claims 147-154, 157-160, 162-166, 171-176, 178-181, 186-192, 194-198 and 203-208

Claims 147-154, 157-160, 162-166, 171-176, 178-181, 186-192, 194-198 and 203-208 were generally rejected by the Examiner on the Office Action Summary page, but were not specifically rejected within the Detailed Action of the Office Action. Accordingly, the Applicant is uncertain whether or not the Examiner intended to reject claims 147-154, 157-160, 162-166, 171-176, 178-181, 186-192, 194-198 and 203-208 with this Office Action. However, the Applicant respectfully submits that claims 147-154, 157-160, 162-166, 171-176, 178-181, 186-192, 194-198 and 203-208 are patentable and that any potential rejection of claims 147-154, 157-160, 162-166, 171-176, 178-181, 186-192, 194-198 and 203-208 under the cited references is unsupported by the art.

As provided above, the rejection of claim 144 is unsupported by the art and should be withdrawn. Because claims 147-154 and 157-160 depend either directly or indirectly upon claim 144, any potential rejection of claims 147-154 and 157-160 is also unsupported by the art.

Further, as provided above, the rejection of claim 161 is unsupported by the art and should be withdrawn. Because claims 162-166 and 171-176 depend either directly or indirectly upon claim 161, any potential rejection of claims 162-166 and 171-176 is also unsupported by the art.

Additionally, as provided above, the rejection of claim 177 is unsupported by the art and should be withdrawn. Because claims 178-181 and 186-192 depend either directly or indirectly upon claim 177, any potential rejection of claims 178-181 and 186-192 is also unsupported by the art.

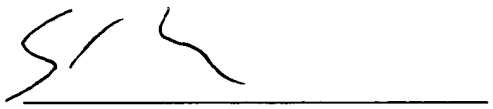
Still further, as provided above, the rejection of claim 193 is unsupported by the art and should be withdrawn. Because claims 194-198 and 203-208 depend either directly or indirectly upon claim 193, any potential rejection of claims 194-198 and 203-208 is also unsupported by the art.

CONCLUSION

In conclusion, the Applicant respectfully asserts that claims 49-76 and 124-208 are patentable for the reasons set forth above, and that the application is now in a condition for allowance. Accordingly, an early notice of allowance is respectfully requested. The Examiner is requested to call the undersigned at 858-456-1951 for any reason that would advance the instant application to issue.

Dated this the 20th day of September, 2004.

Respectfully submitted,



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